

AMENDMENTS TO THE CLAIMS

Please amend the claims as set forth below in marked-up form. This listing of claims will replace all prior versions and listings of claims in the application.

1. (Currently Amended) A vascular closure assembly, comprising:

an anchor;

a collagen;

a suture coupled to the anchor and extending through the collagen;

a housing;

a suture locking mechanism residing in the housing, the suture locking mechanism including a wedge shaped portion;

the suture locking mechanism comprising a non-locked position and a locked position;

the ~~suture locking~~ vascular closure assembly being adapted so that the suture can pass through the housing ~~and engage in a space defined at least in part between the housing and~~ wedge shaped portion of the suture locking mechanism; wherein

the suture would engage the suture locking mechanism such that the suture is capable of movement when the suture locking mechanism is in the non-locked position and the suture is relatively incapable of movement when the suture locking mechanism is in the locked position.

2. (Currently Amended) The assembly according to claim 1, wherein the suture locking mechanism changes from the non-locked position to the locked position by ~~rotational~~ sliding movement.

3. (Currently Amended) The assembly according to claim 2, wherein the suture locking mechanism comprises ~~a plurality of locking post, wherein~~
~~the plurality of locking posts are arranged such that they provide a substantially non-~~
~~tortuous suture path when the suture locking mechanism is in the non-locked position; and~~
~~the plurality of locking posts are arranged such that they provide a substantially tortuous~~
~~suture path when the suture locking mechanism is in the locked position~~
a suture channel sized for the suture to pass through a portion of the locking mechanism.

4. (Currently Amended) The assembly according to claim ~~[[3]]~~ 1, wherein
in the non-locked position, ~~a first surface area of the plurality of locking posts~~ the wedge
shaped portion of the locking mechanism is spaced apart from the housing and is adapted to be in
contact with a suture providing a first amount of frictional resistance to movement of the suture;
and
in the locked position, ~~a second surface area of the plurality of locking posts~~ the wedge
shaped portion of the locking mechanism is in engagement with the housing and is adapted to be
in contact with the suture providing a second amount of frictional resistance to movement of the
suture.

5. (Currently Amended) The assembly according to claim ~~[[4]]~~ 1, wherein ~~the first~~
~~surface area is less than the second surface area~~ the wedge shaped portion of the locking
mechanism includes a planar surface that is arranged to engage a planar inner surface of the
housing.

6. (Currently Amended) The assembly according to claim [[4]], wherein ~~the suture locking mechanism rotates from the non-locked position to the locked position~~ the housing includes a distal open end, and the locking mechanism is movable within the housing in a direction at least partially toward the distal open end when moving from the non-locked position to the locked position.

7. (Currently Amended) The assembly according to claim [[4]], wherein ~~at least one of the plurality of locking posts comprises at least one of a textured surface, a ribbed surface, a grooved surface, a notched surface, and a channeled surface to increase the frictional resistance~~ the wedge shaped portion includes an acute angled portion.

8. (Currently Amended) The assembly according to claim [[3]] 1, wherein ~~the suture locking posts comprise at least one of a triangular shape, a circular shape, a elliptical shape, a rectangular shape, a semi-circular shape, a semi-elliptical shape, a trapezoidal shape, and an irregular shape~~ the wedge shaped portion includes an obtuse angled portion

9. (Currently Amended) The assembly according to claim 2, wherein the ~~rotational~~ sliding movement is caused by expansion of [[a]] the collagen.

10. (Currently Amended) The assembly according to claim [[2]] 1, wherein the suture locking mechanism comprises at least one channel through the housing.

11. (Original) The assembly according to claim 10, wherein

the at least one channel is arranged such that it provides a substantially non-tortuous suture path when the suture locking mechanism is in the non-locked position; and

the at least one channel is arranged such that it provides a substantially tortuous suture path when the suture locking mechanism is in the locked position.

12. (Original) The assembly according to claim 11, wherein the non-tortuous path is substantially parallel to the suture and the tortuous path has at least a portion that is substantially non-parallel to the suture.

13. (Original) The assembly according to claim 10, wherein the channel is substantially straight.

14. (Original) The assembly according to claim 10, wherein the channel has at least one bend.

15. (Original) The assembly according to claim 10, wherein the channel has a surface comprising at least one of a textured surface, a ribbed surface, a grooved surface, and a notched surface to increase the frictional resistance.

16. (Currently Amended) The assembly according to claim [[10]] 1, wherein the channel comprises:

a wide end; and

a narrow end, wherein

~~when in the non-locked position the suture would reside generally in the wide end such that the channel would offer reduced resistance to movement of the suture, and wherein~~

~~when in the locked position the suture would reside generally in the narrow end such that the channel would offer increased resistance to movement of the suture.~~

locking mechanism is triangular shaped.

17. (Currently Amended) The assembly according to claim [[16]] 1, wherein the narrow end comprises at least one of a textured surface, a ribbed surface, a grooved surface, and a notched surface to increase the frictional resistance wherein the locking member includes at least three exterior surfaces, the locking member being positioned in the housing so that the suture can engage at least two of the exterior surfaces.

18. (Currently Amended) The assembly according to claim 16, wherein at least the narrow end is coated with at least one of an adhesive, a mastic, and a tape to increase the frictional resistance 1. wherein the locking mechanism includes at least one exterior surface arranged for engagement by the suture, the at least one exterior surface being coated with at least one of an adhesive, a mastic, and a tape to increase frictional resistance.

19. (Currently Amended) The assembly according to claim 1, wherein ~~the suture locking mechanism comprises an inner housing assembly; and the inner housing assembly is arranged at least partially internal to the housing, such that~~ when the suture locking mechanism is in the non-locked position at least one gap exists between the housing and the ~~inner housing assembly~~ suture locking mechanism and the suture is relatively capable of movement and when the suture locking mechanism is in the locked position the at least one gap is closed and the suture is relatively incapable of movement.

20. (Currently Amended) The assembly according to claim 1, wherein the suture locking mechanism comprises:

at least one pair of mating surfaces, wherein

when in the non-locked position the at least one pair of mating surfaces are separated from the housing so that the suture is capable of movement and when in the locked position the at least one pair of mating surfaces are mated with the housing so that the suture is incapable of movement.

21. (Currently Amended) A vascular closure device, comprising:

an anchor;

a collagen;

a locking device; and

a suture coupled to the anchor and extending through the collagen and the locking device, wherein the locking device comprises:

a housing; and

at least one wedge shaped locking element positioned in the housing, wherein the at least one locking element has a first orientation and a second orientation;

the first orientation providing the suture with a relatively non-tortuous path defined at least in part between the housing and the locking element; and

the second orientation providing the suture relatively tortuous path defined at least in part between the housing and the locking element.

22. (Currently Amended) The closure device according to claim 21, wherein the at least one locking element comprises ~~at least one post~~ a channel configured for passage of the suture.

23. (Currently Amended) The closure device according to claim ~~[[22]]~~ 21, wherein the at least one ~~post comprises a plurality of posts~~ locking element includes an obtuse angled portion.

24. (Currently Amended) The closure device according to claim ~~[[22]]~~ 21, wherein the at least one ~~post locking element~~ includes at least one of a textured surface, a ribbed surface, a grooved surface, a notched surface, and a channeled surface to increase the frictional resistance.

25. (Currently Amended) The closure device according to claim 21, wherein the at least one locking element comprises ~~a channel~~ an acute angled portion.

26. (Currently Amended) The closure device according to claim ~~[[25]]~~ 21, wherein the first orientation provides a non-tortuous path substantially parallel to the suture path and the second orientation provides a tortuous path having at least a portion that is substantially non-parallel to the suture path.

27. (Currently Amended) The closure device according to claim ~~[[25]]~~ 22, wherein the channel is substantially straight.

28. (Currently Amended) The closure device according to claim ~~[[25]]~~ 22, wherein the channel includes at least one curve.

29. (Currently Amended) The closure device according to claim ~~[[25]]~~ 22, wherein the channel includes a surface comprising at least one of a textured surface, a ribbed surface, a grooved surface, and a notched surface to increase the frictional resistance.

30. (Currently Amended) The closure device according to claim ~~[[25]]~~ 21, wherein ~~the housing defines a the channel comprises sized to receive the at least one locking element. the~~ housing channel comprising:

a wide end; and

a narrow end, wherein

in the first orientation the suture is relatively adjacent the wide end and in the second orientation the suture is relatively adjacent the narrow end.

31. (Original) The closure device according to claim 30, wherein the narrow end includes at least one of a textured surface, a ribbed surface, a grooved surface, a notched surface, an adhesive, a mastic, and a tape to increase the frictional resistance.

32. (Currently Amended) The closure device according to claim 21, wherein ~~the-at least one locking element comprises:~~

~~an inner housing assembly; wherein~~

in the first orientation the ~~inner housing assembly~~ at least one locking element is spaced apart from the housing to form a gap through which the suture passes and in the ~~section~~ second orientation the ~~inner housing assembly~~ at least one locking element is adjacent the housing to close the gap.

33. (Currently Amended) A vascular closure device, comprising:

an anchor;

a collagen;

a suture; and

~~means for locking the suture~~ a suture locking assembly, the suture locking assembly including a housing and a wedge shaped locking element positioned in the housing, wherein the suture is coupled to the anchor and extends through the collagen and the ~~means for locking the suture~~ suture locking assembly in a space defined at least in part between the housing and the locking element.

34. (Currently Amended) The vascular closure device according to claim 33 wherein ~~the means for locking comprises:~~

~~a plurality of locking posts arranged along a suture pathway having~~ locking element has at least a first orientation and a second orientation, such that in the first orientation the suture pathway is relatively non-tortuous and in the second orientation the suture pathway is relatively tortuous.

35. (Currently Amended) The vascular closure device according to claim 33, wherein the ~~means for locking~~ assembly comprises a channel defined between the locking element and the housing, the channel having a first orientation and a second orientation, such that in the first orientation the suture pathway is relatively non-tortuous and in the second orientation the suture pathway is relatively tortuous.

36. (Currently Amended) The vascular closure device according to claim [[33]] 35, wherein the tortuous suture pathway is formed by a narrowing of the channel.

37. (Currently Amended) The vascular closure device according to claim [[33]] 34, wherein ~~the means for locking comprises:~~

~~a housing; and~~

~~an inner housing assembly having a first orientation and a second orientation, such that~~
in the first orientation a gap is formed between the ~~inner housing assembly~~ locking element and the housing and in the second orientation the ~~inner housing assembly~~ locking element is flush with the housing.

38. (Currently Amended) A vascular closure assembly, comprising:

an anchor;

a collagen;

a suture coupled to the anchor and extending through the collagen;

a housing;

~~a plurality of locking posts residing in the housing;~~

~~the plurality of locking posts arranged to define a pathway for the suture;~~

a wedge shaped locking element positioned in the housing;

the housing locking element having a first orientation and a second orientation relative to the housing;

in the first orientation, ~~the plurality of locking posts provide~~ locking element provides a non-tortuous pathway for the suture that is defined at least in part between the housing and the locking element such that the suture can move relative to the housing; and

in the second orientation, ~~the plurality of locking posts provide~~ locking element provides a tortuous pathway for the suture that is defined at least in part between the housing and the locking element such that the suture is relatively immobile relative to the housing.

39. (Currently Amended) The vascular closure assembly according to claim 38, wherein ~~each of the plurality of locking posts~~ locking element has a first surface area in contact with the suture when in the first orientation and a second surface area in contact with the suture when in the second orientation.

40. (Previously Presented) The vascular closure assembly according to claim 39, wherein the first surface area is less than the second surface area.

41. (Previously Presented) The vascular closure assembly according to claim 39 wherein, the second surface area includes at last one of a textured portion, a ribbed portion, a grooved portion, a notched portion, a channeled portion, an adhesive portion, a mastic portion, and a taped portion.

42. (Currently Amended) The vascular closure assembly according to claim 38, wherein at least one of the housing and the locking element comprises a bio-resorbable material ~~is used to make the suture locking assembly.~~

43. (Currently Amended) A vascular closure assembly, comprising:

an anchor;

a collagen;

a suture coupled to the anchor and extending through the collagen;

a housing;

a wedge shaped locking element positioned in the housing;

a channel formed in the housing defining a suture pathway;

the housing locking element having a first orientation and a second orientation relative to the housing;

in the first orientation, the channel provides a non-tortuous pathway for the suture that is defined at least in part between the housing and the locking element such that the suture can move relative to the housing; and

in the second orientation, the channel provides a tortuous pathway for the suture that is defined at least in part between the housing and the locking element such that the suture is relatively immobile relative to the housing.

44. (Previously Presented) The vascular closure assembly according to claim 43, wherein the channel is straight.

45. (Previously Presented) The vascular closure assembly according to claim 44, wherein the channel comprises at least one curved portion.

46. (Previously Presented) The vascular closure assembly according to claim 43, wherein

a greater surface area of the channel is in contact with the suture when in the second orientation than when in the first orientation.

47. (Previously Presented) The vascular closure assembly according to claim 43, wherein the channel comprises:

a wide end; and

a narrow end,

such that the suture would pass relatively closer to the wide end when the housing is in the first orientation and the suture would pass relatively closer to the narrow end when the housing is in the second orientation.

48. (Previously Presented) The vascular closure assembly according to claim 47, wherein the narrow end is sized to snugly fit the suture when in the second orientation and to provide resistance to suture movement.

49. (Currently Amended) The vascular closure assembly according to claim 43, wherein at least one of the housing and the locking element comprises a bio-resorbable material ~~is used to make the suture locking assembly.~~

50. (Currently Amended) A vascular closure assembly, comprising:

- an anchor;
- a collagen;
- a suture coupled to the anchor and extending through the collagen;
- an external housing;
- an internal space formed by the external housing;
- the internal space having at least one lower surface;
- an inner housing assembly;
- the inner housing assembly resides in part in the internal space;
- the inner housing assembly having a wedge shaped portion that defines at least one mating surface corresponding to the at least one lower surface; and
- the inner housing assembly having a first position and a second position, wherein

in the first position, the inner housing assembly is suspended in the internal space such that the at least one mating surface does not abut the at least one lower surface and the suture is relatively moveable relative to the suture locking assembly in a suture space that is defined between the at least one lower surface of the external housing and the mating surface of the inner locking housing; and

in the second position, the inner housing assembly rests on the external housing such that the at least one mating surface abuts the at least one lower surface and the suture is relatively immobile relative to the suture locking assembly in the suture space.

51. (Previously Presented) The vascular closure assembly according to claim 50, wherein the inner housing assembly includes a channel through which the suture can pass.

52. (Currently Amended) The vascular closure assembly according to claim 50, ~~further comprising:~~

~~a suture; and~~

~~wherein~~ the suture is threaded through the ~~suture locking assembly~~ internal space such that the suture passes adjacent the at least one mating surface, wherein

a tension on the suture causes the suture to apply an opening force on the at least one mating surface so the inner housing assembly does not abut the at least one lower surface.

53. (Currently Amended) The vascular closure assembly according to claim 50, ~~further comprising:~~

~~a collagen;~~ wherein expansion of the collagen provides a force that tends to seat the at least one mating surface and the at least one lower surface.

54. (Currently Amended) The vascular closure assembly according to claim 50, wherein at least one of the housing and the inner housing assembly comprises a bio-resorbable material ~~is used to make the suture locking assembly.~~

55. (Currently Amended) A vascular closure assembly, comprising:

an anchor;

a collagen;

a suture coupled to the anchor and extending through the collagen;

a housing;

the housing having a housing pathway for a suture;

a locking device having a wedge shaped portion;

the locking device having a plurality of mating surfaces defined by the housing and the locking device, and a locking device pathway for the suture;

the locking device slidably coupled to the housing such that the locking device has at least a first position and a second position relative to the housing;

in the first position, the plurality of mating surfaces provide a gap through which the suture can move relative to the suture locking assembly; and

in the second position, the plurality of mating surfaces abut and grasp the suture so the suture is relatively immobile relative to the suture locking assembly.

56. (Previously Presented) The vascular closure assembly according to claim 55, wherein

the housing further comprises at least a first hole corresponding to the first position and at least a second hole corresponding to the second position; and

the locking device comprises at least a tab capable of engaging at least the first hole in the first position and at least the second hole in the second position.

57. (Previously Presented) The vascular closure assembly according to claim 56, wherein the housing comprises sidewalls, such that the sidewalls provide angle inwards from at least the first hole to at least the second hole.

58. (Previously Presented) The vascular closure assembly according to claim 57, wherein the inward slope of the sidewalls provides a compressive force on the locking device tending to cause the plurality of mating surfaces to move towards each other.

59. (Currently Amended) The vascular closure assembly according to claim 55, wherein at least one of the housing and the locking device comprises a bio-resorbable material is ~~used to make the suture locking assembly.~~

60. (Currently Amended) A vascular closure device, comprising:

an anchor;

a collagen;

a suture coupled to the anchor and extending through the collagen;

~~a tamping tube;~~

a housing;

a wedge shaped locking element positioned in the housing;

the housing having ~~a base and~~ at least one flexible internal sidewall, the ~~flexible locking element being movable into and out of engagement with the~~ sidewall ~~being under a compressive force;~~

when ~~unresisted, the~~ in engagement, a compressive force between the sidewall and the locking element causes at least one grasping surface on the at least one ~~flexible~~ sidewall to grasp a suture, and

~~the tamping tube releasably coupled to the at least one flexible sidewall to resist the compressive force and inhibit the at least one grasping surface from grasping the suture~~

when out of engagement, the suture is released for unrestricted passage through the housing.

61. (Currently Amended) The device according to claim 60, wherein the at least one ~~flexible~~ sidewall comprises:

at least one pair of opposed flexible sidewalls;

each pair of the opposed flexible sidewalls have at least one grasping surface that about a surface of the locking element when the compressive force is unresisted; and

~~each pair of the opposed flexible sidewalls having a seating surface, the seating surface for releasably coupling the tamping tube to the opposed flexible sidewalls.~~

62. (Original) The device according to claim 60, wherein a bio-resorbable material is used to make the device.